

Personality traits and abilities as predictors of academic achievement

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The purpose of this study was to demonstrate the respective effects of cognitive abilities and personality traits on academic achievement. The subjects were 141 sixth-grade French adolescents (mean age: 12) who took three cognitive tests (g factor, numerical ability, and spatial ability) and answered a personality questionnaire based on the Big Five Model. Path analyses indicated that Openness-intellect had an effect on junior high school achievement in all disciplines, with most effects being indirect ones mediated by verbal achievement (French). Neuroticism-anxiety also had an effect, although not as marked and mainly on mathematics. Personality is complementary to abilities in predicting academic achievement. Possible conceptual extensions and field applications are addressed in the conclusion.

Introduction

The prediction of success or failure in school is quite often based on cognitive variables, usually assessed on Wechsler's (1996) intelligence scales. In an attempt to improve such predictions, there has been an upsurge of interest within the past few years in noncognitive (conative) variables. Emerging in the literature are "new forms of intelligence" like emotional intelligence (Mayer, Caruso, & Salovey, 2000; Salovey & Mayer, 1990) and its quotient, EQ, a direct competitor of IQ (Goleman, 1995).

Another way of taking noncognitive variables into account is to use personality traits to predict performance, either alone or in conjunction with cognitive abilities. Although not new, this approach now has a unified framework, something it had lacked in the past (Boekaerts, 1996; De Fruyt & Mervielde, 1996), the five-factor models (Goldberg, 1990; Costa & McCrae, 1992). Two traits in these models, Extraversion and Neuroticism, have been used to examine the links between intelligence and personality in many studies based on Eysenck's model (for reviews, see Brebner & Stough, 1995; Eysenck, 1994; Zeidner, 1995). The other traits in the Big Five (Conscientiousness, Openness to New Experience, and Agreeableness) have their counterparts in other models of personality, in particular the 16 PF model proposed by Cattell, who also took an interest in the power of traits in predicting academic and occupational success (Cattell, Eber, & Tatsuoka, 1970).

Personality traits and performance

Extraversion (E) reflects qualities like dynamic, energetic, and active, so it is likely to be a favorable dimension for scholastic achievement. However, extraverted subjects may be impulsive and have trouble concentrating on academic material, which could be detrimental (Eysenck, 1996). Empirical support for the latter claim is provided by the fact that correlations between Extraversion and academic achievement are usually very close to zero (Eysenck, 1994). Apparently, this trait does not have the same effect at all ages, since the correlations are mostly positive in young children and then become negative for secondary school and university age groups (Eysenck, 1996).

Neuroticism (N) seems to be a good predictor of academic achievement: the most emotionally unstable subjects run a greater risk of doing poorly in school. Ackerman and Heggstad's (1997) meta-analysis nevertheless yielded weak correlations of $-.16$ to $-.09$. Correlations with abilities were not much higher, reaching a mere $-.20$ with mathematical-numerical ability. If we look solely at the anxiety facet of the N trait, often taken to be the same thing (M.W. Eysenck, 1997), we can hypothesize that anxious subjects are low achievers since their worries supply parasitic information that has to be processed and thereby interferes with cognition (M.W. Eysenck, 1992). This is in fact what has been observed: this component of anxiety appears to be more detrimental to academic achievement than the emotional component, called physiological anxiety (Communian, 1993). The findings are contradictory though, and suggest that the effects of anxiety, like extraversion, may depend on the amount of education, and more generally on intelligence (De Raad & Schouwenburg, 1996a; Gallagher, 1996). There is a specific form of anxiety called test anxiety, experienced during examinations, which is more tightly linked to intelligence ($-.33$) and to scores on scholastic achievement tests ($-.27$ with mathematics, $-.22$ with learning and memory, in Ackerman and Heggstad's meta-analysis, 1997). One unanswered question is whether this type of anxiety can be regarded as a personality trait, and more generally, whether anxiety can be approached from a uni- or multi-dimensional standpoint (Endler & Parker, 1992).

Conscientiousness (C) reflects qualities such as thoughtful, organized, and methodical (Hogan & Ones, 1997). It should therefore be connected to learning, and should even be an essential learning resource (De Raad & Schouwenbourg, 1996b). The importance of this dimension was illustrated in a study where subjects had to classify adjectives on the basis of whether they were relevant or irrelevant to learning and education (De Raad, 1996). The factor analysis of the 194 adjectives tested brought out two factors, one of which was called conscientiousness. It was correlated at $.89$ with trait C measured on a questionnaire. The important role granted to C follows from the fact that it has both a dynamic facet (need for achievement) and a control facet (cautiousness and criticalness) (Rolland, 1993). C also has much in common with trait G (conformity) of the 16 PF, which is correlated with intelligence tests and academic achievement (Cattell, 1971) and ranks high in the formula for school achievement (the highest coefficients are $.42$ B (intelligence), $.35$ G (conformity), $.35$ M (imagination), $.34$ Q2 (group dependency), and $.33$ Q3 (perfectionism) (Krug & Johnson, 1986). Note that correlations can be expected with academic achievement but not with intelligence, as shown in Ackerman and Heggstad's (1997) empirical data, and described in Brand's (1994) and Costa and McCrae's (1992) theoretical models.

The two studies just mentioned grant an important role to *Openness to Experience*. In the Five Factor Model, the facets of this trait correspond to the areas where a subject can exhibit more or less openness: aesthetics, feelings, actions, ideas, and values (Costa & McCrae, 1992). In the Big Five Model (Goldberg, 1990, 1994), this trait is called Intellect, which is a reflection of the desire to go beyond the cognition-conation dichotomy (Kohnstamm, Mervielde, Besevegis, & Halverson, 1995). But it also re-launches the debate about the role granted to intelligence in models of personality, too great for some (H.J. Eysenck, 1992), too restricted for others (Brand, 1994). McCrae and Costa (1997) consider Openness to be the

only trait in their model that is correlated with intelligence and other abilities, but it is not confounded with them: this rules out the term "Intellect" which is too close to Intelligence. Other arguments are proposed by McCrae and Costa (ibid.) to defend Openness, a broader term than Intellect since it encompasses motivational processes, at the same time as it is more specific than Intellect because it is independent of the Conscientiousness factor. The inclusion of Intellect in Openness was also proposed by Ostendorf and Angleitner (1994), who consider Openness to ideas (Intellect) to be a necessary but insufficient condition for Openness to other domains. At the empirical level, there are significant correlations between Openness and all domains of crystallized intelligence (Ackerman & Heggestad, 1997).

Agreeableness is not directly associated to performance, but in combination with Conscientiousness, can be part of Character Education (De Raad, 1996). This trait indeed encompasses important qualities for working in groups, and may play a role in evaluations of behavior in class more than of written work (Rothstein, Paunonen, Rush, & King, 1994). The correlations given in the literature are generally insignificant.

In summary, the closest traits to academic achievement are O and C, the farthest, A and E, with N in the middle or varying with the subject sample or discipline. In addition to these considerations dealing mainly with adults, note that basically the same findings have been obtained for adolescents. Their personality can also be described using a five factor model (Kohnstamm, Mervielde, Besevegis, & Halverson, 1995; Scholte, van Aken, & van Liesthout, 1997). The study by John, Caspi, Robins, Moffitt, and Stouhamer-Loeber (1994) on 12-13 year-old children describes such a model and the links between personality and cognition: two traits, Conscientiousness and Openness, had correlations of about .20 with academic achievement and between .20 (for C) and .40 (for O) with IQ.

The studies presented above generally rely on trait-by-trait, linear-correlation analyses, which regrettably fail to simultaneously take all dimensions into account in view of defining a structural model. The only exception is the work by P.L. Ackerman, who conducted an empirical study using cognitive ability tests, baseline laboratory tasks, and questionnaires about personality and interests on 138 students (Goff & Ackerman, 1992). A factor analysis on the 13 personality and interest variables tested yielded a five dependent-factor solution which included Intellectual Engagement, quite strongly correlated with Openness ($r=.65$) and moderately with Conscientiousness ($r=.27$). The only significant links between personality and performance, assessed by extending the factor analyses to cognitive variables, were with Openness-crystallized intelligence. Based on this data and the meta-analysis mentioned above, Ackerman and Heggestad (1997) proposed a model that takes personality traits, interests, and abilities into account, in view of organizing them into four "ability complexes" (Snow, 1987): social (Extraversion, entrepreneurial), conventional (Conscientiousness, conformist, perceptual speed), scientific/mathematical (realistic, visual perception), and intellectual/cultural (Openness, artistic, crystallized intelligence). This type of study provides a better picture of the correlated dimensions and clearly illustrates the idea that "a behavior that differentiates children in school can only be described – and thereby explained – by inserting it in a structure of other differentiating variables" (Reuchlin, 1991, p. 10, our translation).

Hypotheses

The above perspective was used as a framework for the study presented here, which is aimed at determining the major predictors of academic achievement, with each trait being potentially more specifically connected to a given discipline. In an initial study on 171 sixth-grade students (Gilles, Bailleux, Flamand, & Dalle, 2000), the Conscientiousness trait turned out to be an important predictor of adjustment in junior high school; Emotional Stability was linked to mathematics, and Openness to language arts (in this case, French). Neither Extraversion nor Agreeableness was linked to academic achievement, so they were discarded in future analyses. Openness was a moderate predictor that was overridden by

Conscientiousness, which had better psychometric properties and shared 30% of the variance. Moreover, the factor model that best fit the data combined these two traits into an Engagement dimension (Gilles & Bailleux, 1999), close to the "need for knowledge" (Sadowski & Cogburn, 1997). Given that these findings were only partly in line with the data in the literature, it seemed worthwhile to follow up on this study, with the goal of dissociating Openness and Conscientiousness. This would be more consistent with the five factor model and avoids some problems connected to overarching concepts like typical intellectual engagement (Goff & Ackerman, 1992; Rocklin, 1994). This first goal could potentially be reached by using facets, which seem to be better predictors than global traits (De Fruyt, Mervielde, 1996; De Raad, 1996; Rothstein, et al., 1994). Our second goal was to find out what might be gained in the prediction of academic achievement by adding personality traits instead of using only abilities, which turn out to be the best predictors (Rouxel, 1999). To achieve this goal, general intelligence, numerical ability, and spatial ability were assessed and used to build a model in which these cognitive dimensions are side by side with personality traits.

Method

Subjects

The study dealt with 141 sixth-grade students of both sexes (81 boys and 60 girls) whose mean age was 12 years ($SD=7$ months). The sample was quite heterogeneous since the children were from two different schools. Nineteen protocols were discarded due to incompleteness.

Materials and procedure

General intelligence was assessed on Subtest 3 of the Culture Fair Test (Cattell, 1959). Numerical and spatial abilities were evaluated on two subtests from the Ability Factor Battery (Manzionne, 1977): a numerical addition subtest where subjects have to say whether the sums given are correct, and a mental rotation subtest where subjects have to recognize two-dimensional stimuli rotated at different angles.

Personality traits were assessed on the French translation of the *Big Five Scales for the California Child Q-Set* (John et al., 1994). In its initial form, subjects have to reply to 48 sentences by stating the extent to which they agree (or disagree) on a 6-point Likert scale. Because of the large difference between the number of items per trait (e.g., 13 items for Neuroticism vs. 7 for Openness), we retained only the items with the best psychometric properties (7 items per trait), as determined by the answers given in a preliminary study on 276 participants (different from the ones in the present study). The reliability of the scales that made up each trait was satisfactory (Spearman-Brown's split half coefficient: $C=0.821$, $N=0.706$, $O=0.681$). Construct validity, tested using a confirmatory factor analysis, yielded five facets, two for the Conscientiousness trait: control (e.g., *I'm careful and orderly*) and motivation (e.g., *I'm determined about what I do*), two for Neuroticism: impulsiveness (e.g., *I am easily irritated in the face of a problem*) and anxiety (e.g., *When I have a problem, it bothers me for a long time*), and one for Openness: intellect (*I'm curious and I like to learn new things*). These facets are consistent with the data in the above studies.

Testing was done in groups of about twenty students and lasted half an hour. The participants answered the test items for factor g first, the spatial items next, and the numerical items after that. They filled in the personality questionnaire last.

The academic achievement measures were the marks obtained in French, math, history-geography, and foreign language (English) for the first term of the school year, and the mathematical and verbal achievement scores obtained on scholastic achievement tests taken at the beginning of the year.

Results and discussion

Personality traits and academic achievement

The correlation matrix (Table 1) indicated high correlations between the students' marks in school (mean .688), and moderate but usually significant correlations between their cognitive test scores and their marks in school (mean .263). Only three personality facets were significantly correlated with marks in school: all disciplines combined for Openness-intellect, math and foreign language for Neuroticism-anxiety, and math for Conscientiousness-motivation. A series of multiple regression analyses with personality traits as predictors and marks in school as criteria confirmed the predictive validity of the Openness-intellect trait for all disciplines, but not the other personality traits (Table 2).

Table 1
Means, standard deviations, and correlations between academic achievement, cognitive ability test scores, and personality traits. Correlations of at least .18, shown in boldface, are significant at .05 (n=122)

	French	Math	H-G	FL	VAST	MAST	g	NA	SA	C-con	C-mot	N-imp	N-anx	m	s
French	1													11.39	3.67
Math	.61	1												13.66	4.19
H-G	.72	.67	1											11.39	3.33
FL	.65	.61	.72	1										13.27	3.98
VAST	.82	.65	.71	.68	1									65.46	16.74
MAST	.67	.76	.65	.63	.77	1								59.51	18.88
g	.19	.36	.21	.22	.17	.26	1							8.2	2.3
NA	.37	.36	.20	.26	.38	.50	.31	1						8.64	3.31
SA	.26	.33	.30	.20	.28	.37	.25	.39	1					7.85	7.64
C-con	.14	.14	.08	.02	.14	.13	-.06	.08	-.07	1				13.13	3.17
C-mot	.11	.18	.16	.11	.11	.15	-.15	.02	.07	.49	1			13.24	3.05
N-imp	0	0	-.01	1	-.06	-.01	.15	-.03	.04	-.03	-.12	1		14.89	4.8
N-anx	.13	.20	.16	.25	.11	.21	.07	.01	.14	.21	.45	1	1	11.75	3.91
O-int	.27	.33	.28	.21	.27	.29	-.05	.19	-.01	.45	.44	-.18	.15	17.19	3.75

Note. French: term average in French class. Math: term average in math class. H-G: term average in history-geography class. FL: term average in foreign language class (English). VAST: verbal achievement score on scholastic test (French). MAST: mathematical achievement score on scholastic test. g: score on Cattell's Culture Fair Test. NA: score on the numerical addition test of the Ability Factor Battery. SA: score on the mental rotation test of the Ability Factor Battery. C-con: control facet of the Conscientiousness trait. C-mot: motivation facet of the Conscientiousness trait. N-imp: impulsiveness facet of the Neuroticism trait. N-anx: anxiety facet of the Neuroticism trait. O-int: intellect facet of the Openness trait.

Table 2
Predicting academic achievement by personality trait facets: β coefficients of multiple regressions. Significant values ($p<.05$) are shown in boldface (see Table 1 for abbreviations)

	C-con	C-mot	N-imp	N-anx	O-int	R ²
French	.036	-.044	-.006	.100	.256	.083
Math	-.03	.021	-.020	.167	.307	.135
History-Geography	-.091	.054	-.017	.133	.272	.099
Foreign Language	-.126	.037	.056	.196	.236	.105
Verbal Achievement Test	.041	-.048	-.066	.106	.240	.080
Mathematical Achievement Test	-.020	-.001	-.053	.197	.265	.118

The results of an earlier study (Gilles, Bailleux, Flamand, & Dalle, 2000) were thus only partially replicated, so the best causal path model from the standpoint of the fit indexes is not the same (Figure 1). The observed correlations allowed us to select which facets to use for N and C. Only N-anxiety was retained for the Neuroticism trait. Because the values obtained for the two facets of Conscientiousness were very close, several models were tested and resulted in the selection of C-motivation (replacing it with C-control did not give a better fit: $\chi^2=18.23$, $df=19$, $p=.51$, $GFI=.97$).

The subjects' initial academic achievement level assessed on the scholastic tests was a good predictor of marks in junior high school, with the score in verbal achievement as the determining factor. Regarding the role of the personality variables, the only direct effects were generated by N-anxiety (on the mathematical achievement test score and on foreign language) and O-intellect (on the mathematical and verbal achievement test scores). C-motivation did not have a significant effect on any variable, whether directly or indirectly (Table 3), so it was eliminated from the rest of the analyses. N-anxiety had an indirect effect on math (via the mathematical achievement test score) and O-intellect had a systematic effect on marks in school, mainly by way of the verbal achievement test score.

These results are compatible with the findings in the literature. Anxiety affected particular areas such as math and foreign language, a new subject for these students. Openness-intellect was the most important trait in predicting academic success: its direct effect on the verbal achievement score was comparable to the correlations usually observed with crystallized intelligence (Ackerman & Heggestad, 1997), which has to be present for Openness to have an impact on junior high school performance. The lack of a significant predictive power for trait C may be due to the large amount of variance shared with O (more than 20%, as much as that observed for the C and N facets). Although less than in previous studies (Gilles & Bailleux, 1999), C and O still overlapped substantially and left no room for the two traits taken together.

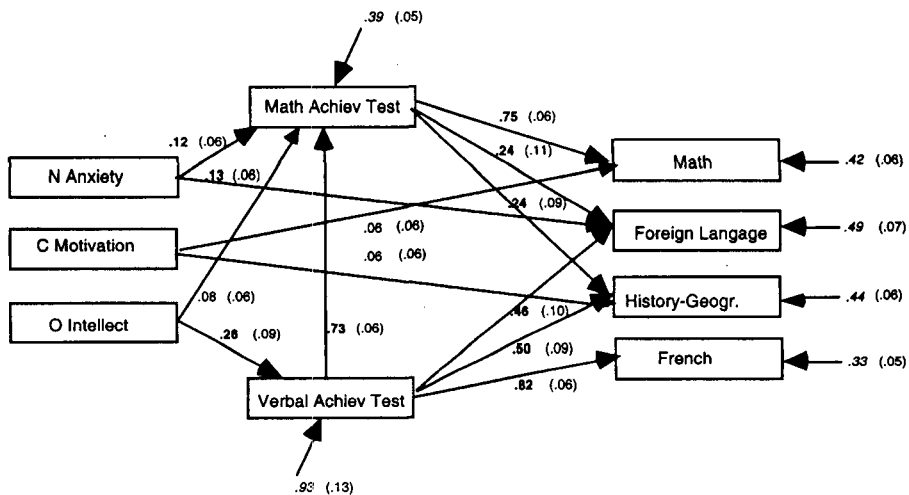


Figure 1. Causal path model of the effects of personality on academic achievement in junior high school

Note. $\chi^2=14.61$, $df=19$, $p=.75$, $GFI=.97$, $n=122$. Path coefficients are shown in boldface, errors are in parentheses, and unexplained variances are in italics.

Table 3

Direct and indirect effects of personality traits on academic achievement (See Table 1 for abbreviations)

	DIRECT	INDIRECT	TOTAL
EFFECT ON MATH			
N-anxiety	0	.09(<i>t</i> =1.94)	.09(<i>t</i> =1.94)
C-motivation	0	0	0
O-intellect	0	.21(<i>t</i> =2.96)	.21(<i>t</i> =2.96)
ON FOREIGN LANGUAGE			
N-anxiety	.13(<i>t</i> =2.01)	.03(<i>t</i> =1.50)	.16(<i>t</i> =2.45)
C-motivation	0	0	0
O-intellect	0	.19(<i>t</i> =2.97)	.19(<i>t</i> =2.97)
ON HISTORY-GEOGRAPHY			
N-anxiety	0	.03(<i>t</i> =1.57)	.03(<i>t</i> =1.57)
C-motivation	0	0	0
O-intellect	0	.20(<i>t</i> =2.99)	.20(<i>t</i> =2.99)
ON FRENCH			
N-anxiety	0	0	0
C-motivation	0	0	0
O-intellect	0	.22(<i>t</i> =2.82)	.22(<i>t</i> =2.82)
ON MATHEMATICAL ACHIEVEMENT TEST			
N-anxiety	.12(<i>t</i> =1.97)	0	.12(<i>t</i> =1.97)
C-motivation	0	0	0
O-intellect	.08(<i>t</i> =1.33)	.19(<i>t</i> =2.79)	.28(<i>t</i> =3.06)
ON VERBAL ACHIEVEMENT TEST			
N-anxiety	0	0	0
C-motivation	0	0	0
O-intellect	.26(<i>t</i> =2.87)	0	.26(<i>t</i> =2.87)

Cognitive abilities, personality traits, and academic achievement

Based on these results, we tried incorporating cognitive abilities into the model. Except in one case, the mark obtained in every school discipline was correlated with all three cognitive tests (Table 1). Multiple regression analyses further specified these links as follows: *g* factor to math, numerical ability to achievement test scores and to French, and spatial ability to math and history-geography marks (Table 4). We thus obtained the expected predictive validity for these tests, with the amount of explained variance ranging from .065 to .251. These values are comparable, and above all complementary, to those obtained for the personality traits: the correlations between abilities and personality traits being weak, the inclusion of both cognitive and conative dimensions considerably improved the explanatory power, since it was practically the same as adding the variances predicted by the two dimensions separately (Table 5).

Table 4

*Predicting academic achievement by cognitive abilities: β coefficients from multiple regressions. Significant *p*-values (*p* < .05) are shown in boldface (see Table 1 for abbreviations)*

	<i>g</i>	NA	SA	R ²
French	.144	.199	.132	.123
Math	.254	.136	.218	.203
History-Geography	.144	.018	.191	.078
Foreign Language	.137	.117	.093	.065
Marks in School (standard deviation)	.206	.142	.184	.153
Verbal Achievement Test	.114	.198	.152	.119
Mathematical Achievement Test	.173	.286	.218	.251

Table 5
Predicting academic achievement by cognitive abilities and personality trait facets: β coefficients of multiple regressions. Significant values ($p<.05$) are shown in boldface (see Table 1 for abbreviations)

	g	NA	SA	N-anx	O-int	R ²
French	.087	.244	.142	.091	.215	.213
Math	.272	.141	.205	.14	.298	.343
History-Geography	.148	.007	.258	.114	.268	.202
Foreign Language	.140	.139	.117	.210	.165	.177
Marks in School (standard deviation)	.197	.160	.205	.165	.270	.300
Verbal Achievement Test	.056	.264	.162	.070	.209	.219
Mathematical Achievement Test	.105	.348	.208	.168	.211	.378

In the light of these initial descriptive analyses and the model depicted in Figure 1, we retained the three cognitive test scores (g, N, S) and the two facets, O-intellect and N-anxiety, to build a causal path model in which academic achievement is predicted by both abilities and personality traits. Its structure is presented in Figure 2. For personality, the previous results are replicated here, namely, a systematic effect of Openness-intellect on academic achievement (ranging from .14 to .20) and an effect of N-anxiety on math and foreign language (.09 to .15). For the cognitive test scores, factor g is a direct predictor of math, which is understandable given the inductive reasoning abilities needed in this discipline. Spatial ability is also linked to math (only), which is a common result for this type of test (Cooper & Regan, 1982). It is a direct predictor of mathematical achievement scores, and an indirect predictor, via these test scores, of marks in junior high school. Numerical ability has a direct effect on both scholastic test scores and on marks in all disciplines (.26 to .42). It thus acts as a general predictor, which can be expected of this type of ability test which relies heavily on scholastic knowledge (see arithmetic subtest of Wechsler scales). For the model as a whole, the cognitive (mainly numerical ability) and conative (mainly Openness-intellect) dimensions complement each other in predicting academic success, in both cases, via the students' initial academic achievement level assessed by scholastic testing.

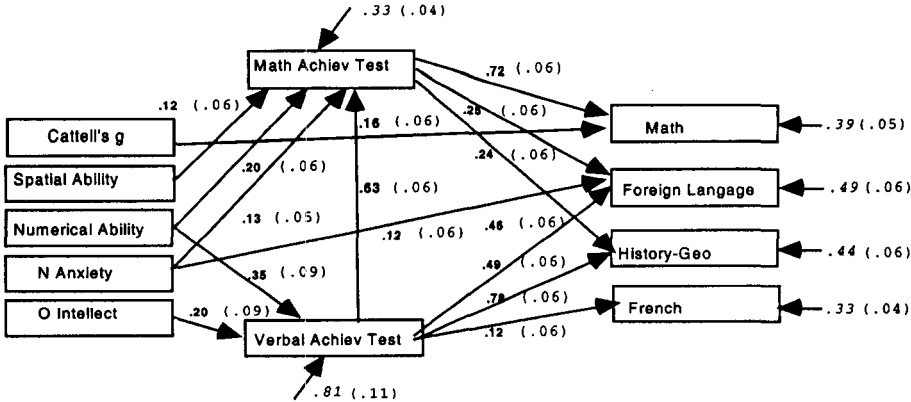


Figure 2. Causal path model of the effects of personality and cognitive abilities on academic achievement in junior high school

Note. $\chi^2=134.64$, $df=34$, $p=.35$, $GFI=.95$, $n=122$. Path coefficients are shown in boldface, errors are in parentheses, and unexplained variances are in italics.

Table 6

Direct and indirect effects of personality traits and cognitive abilities on academic achievement (see Table 1 for abbreviations)

	DIRECT	INDIRECT	TOTAL
EFFECT ON MATH			
Cattell's g	.16(t=2.79)	0	.16(t=2.79)
Num. ability	0	.30(t=4.84)	.30(t=4.84)
Spat. ability	0	.08(t=2.00)	.08(t=2.00)
N-anxiety	0	.09(t=2.37)	.09(t=2.37)
O-intellect	0	.14(t=2.54)	.14(t=2.54)
ON FOREIGN LANGUAGE			
Catell's g	0	0	0
Num. ability	0	.26(t=4.31)	.26(t=4.31)
Spat. ability	0	0	0
N-anxiety	.12(t=1.97)	.03(t=1.71)	.15(t=2.48)
O-intellect	0	.14(t=2.53)	.14(t=2.53)
ON HISTORY-GEOGRAPHY			
Catell's g	0	0	0
Num. ability	0	.27(t=4.35)	.27(t=4.35)
Spat. ability	0	0	0
N-anxiety	0	0	0
O-intellect	0	.15(t=2.53)	.15(t=2.53)
ON FRENCH			
Catell's g	0	0	0
Num. ability	.10(t=1.75)	.27(t=3.91)	.37(t=4.38)
Spat. ability	0	0	0
N-anxiety	0	0	0
O-intellect	0	.16(t=2.32)	.16(t=2.32)
ON MATHEMATICAL ACHIEVEMENT TEST			
Catell's g	0	0	0
Num. ability	.20(t=3.25)	.22(t=3.81)	.42(t=5.29)
Spat. ability	.12(t=2.03)	0	.12(t=2.03)
N-anxiety	.13(t=2.42)	0	.13(t=2.42)
O-intellect	.07(t=1.31)	.13(t=2.30)	.20(t=2.60)
ON VERBAL ACHIEVEMENT TEST			
Catell's g	0	0	0
Num. ability	.35(t=4.08)	0	.35(t=4.08)
Spat. ability	0	0	0
N-anxiety	0	0	0
O-intellect	.20(t=2.35)	0	.20(t=2.35)

Conclusion

The results of this study point out which facets of personality contribute the most to predicting academic success, independently of cognitive predictors. Anxiety has a direct effect, as shown elsewhere (Normandeau & Guay, 1998), especially on math, which is quite consistent with the strongest correlations reported in the meta-analysis by Ackerman and Heggestad (1997). Openness-intellect appears to be a critical predictor, but not Conscientiousness. These results are in line with what could be expected for Openness (McCrae & Costa, 1997), but are somewhat surprising for Conscientiousness. They may be related to the fact that these two traits and their facets are highly correlated, and as a result, the correlations observed between C and academic achievement, and between O and academic achievement (see John et al., 1994) may not be robust, thereby giving rise to unclear correlation patterns when analyzed structurally (Ackerman & Heggestad, 1997). It is also possible that the Conscientiousness trait does in fact have an impact, but in interaction with

other traits: with A for Character Education (De Raad, 1996), with N for the Furneaux Factor (McKenzie & Tindell, 1993; McKenzie, Taghavi-Khonsary, & Tindell, 2000). A third possibility, which is repeatedly found in research on personality and cognitive performance, is that the correlations vary with the characteristics of the participants, such as age (Eysenck, 1996), sex (De Fruyt & Mervielde, 1996), school grade (Rouxel, 1999), and so on. Thus, structural models appear to be useful for determining how traits and performance are organized, but it would be a good idea to test various models on different subject samples.

The links between personality and academic achievement detected using these methods may seem static and descriptive, but they nevertheless stress the importance of devising differentiated teaching methods – personality traits and learning styles appear to be connected. Openness, for example, may be associated with a concept-driven style involving trying to understand the phenomena and developing one's own point of view (Busato, Prins, Elshout, & Hamaker, 1999). The use of facets rather than the general traits in the Big Five points out finer-grained links with certain learning strategies. A case in point is the learning strategy consisting of organizing, relating, and critically evaluating what is being learned, which appears to be linked to Openness in general, and more specifically to its intellect facet (Blicke, 1996). Predicting academic success (or failure) by means of both personality traits and abilities thus constitutes a step towards finding modes of cognitive functioning that are suited to different learning situations, and consequently, towards devising targeted remedial programs.

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Le but de cette recherche est de mettre en évidence l'influence respective des aptitudes et des traits de personnalité sur les performances scolaires. 141 participants, élèves de sixième (âge moyen 12 ans), ont répondu à trois tests cognitifs (facteur g, aptitude numérique, aptitude spatiale) et à un questionnaire de personnalité basé sur le modèle des Big Five. Les analyses de parcours indiquent que l'Ouverture-intellect a une influence sur l'ensemble des performances au collège, la plupart des effets étant indirects, via le niveau en français. Le Névrosisme-anxiété a aussi un effet, plus modeste et principalement sur les mathématiques. La prédiction apportée par la personnalité complète celle qui est donnée par les épreuves d'aptitudes. Les perspectives de prolongement conceptuel et d'application au terrain sont abordées en conclusion.

Key words: Academic achievement, Big Five, Path analysis.

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